

FACILITIES ENERGY MANAGEMENT SUPPORT

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BACKGROUND

Recent interest by the Congress, Presidents, Department of Defense and the Department of the Army requires that the U.S. Army installations make a concerted effort to conserve energy. Executive Order 12902 established an energy reduction goal of 30 percent by the year 2005 compared to the 1985 base line based on MBTU per thousand square foot (MBTU/KSF), added water conservation, required implementation of all projects with payback of 10 years or less and tasked all departments to perform energy audits of 10 percent of their facilities each year. To that end Congress has passed several bills to help installations conserve energy. Energy conservation in the modern sense aims to reduce cost, improve environmental compliance, improve morale, and do so all by intelligently conserving energy with comfort and common sense.

Key elements of the new legislation for facilities are: identify energy managers and provide enhanced energy training; increase use of natural gas; procure energy efficient electric equipment; increase use of energy efficient lighting; and increase use of renewable energy sources. The legislation places emphasis on: Energy Conservation Investment Program (ECIP); Energy Savings Performance Contracting (Shared Energy Savings); Utility Partnering/Demand Side Management Programs; and improved building design standards.

The Army has historically pursued a vigorous energy reduction program; however, new program dimensions and increased energy program dimensions and increased energy project funds are providing increased opportunities. The energy conservation program for the 1990's and into the next century will impact all aspects of installation operations. Conferences, awareness seminars, and technical training will be used to highlight the new elements and opportunities in the new Army Facilities Energy Program.

The Army consumed 27 trillion watt hours (92 Tbtu) of utility energy at a cost of \$819 Million in FY97. The programs and services described in this paper are designed to help

installations reduce energy consumption and reduce operating costs.

ENERGY PROGRAMS AND SERVICES

1. ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP).

The ECIP is a special funded program to provide new, energy efficient system or improve the energy efficiency of existing facilities. Projects funded under ECIP can improve living and working conditions of Army personnel, enhance mission capabilities, and decrease negative environmental impacts of energy systems. Funds designated for ECIP are managed by DoD and do not compete with Army's MCA program. The ECIP MILCON program has separate project submission and execution requirements. The following significant points are highlighted:

- ! The Army share of DoD ECIP funding is expected to remain relatively constant at \$10-12 million per year through FY05. Well documented and justified projects are important in competing for these resources.
- ! Projects are ranked by savings to investment ratio, therefore, an accurate and complete economic analysis is important.

For additional information on policy guidance contact Mr. Hank Gignilliat, DAIM-FDF-U, COM (703) 428-7003; DSN 328, E-Mail: gignilli@pentagon-acsim3.army.mil.

2. ARMY ENERGY CONSERVATION FUND

This program is similar to the ECIP Program. The funding is for energy and water O&M projects. Department of the Army (DA) centrally funds the program, and projects funding of \$40 Million per year through FY05. For additional information on policy guidance contact Mr. Hank Gignilliat, DAIM-FDF-U, COM (703) 428-7003; DSN 328, E-Mail: gignilli@pentagon-acsim3.army.mil.

3. ENERGY ENGINEERING ANALYSIS PROGRAM (EEAP)

The EEAP is the USACE funded program that provides a variety of specialized energy conservation engineering and economic studies that can be performed at installations. The recommendations from the EEAP are intended to result in energy conservation retrofit projects for submission into various funding programs. The EEAP is the primary source of ECIP MILCON projects. This program is going to receive increasing emphasis and be a primary mechanism for complying with the requirements of the Energy Policy Act of

1992 and EO 12902. Installations should review their need for an EEAP study, or update of previous studies. We plan to use this program to get all ECIP projects that meet the 10 year payback criteria into the MILCON program cycle by FY 2000.

4. UTILITY PARTNERING/DEMAND SIDE MANAGEMENT (DSM)

Recent legislation provides greater flexibility for entering into electrical, gas and water demand side management programs with public utilities. Key incentives include: (1) The authority for installations to accept any financial incentive, goods, or services generally available to the public from the utilities, to adopt cost effective technologies and practices offered by the utilities; (2) take advantage of published DSM rebate; (3) allows installations to enter into comprehensive agreements with utilities to design and implement a cost effective demand and conservation incentive program to meet the unique needs of the installation; and (4) allows utilities to advance financing costs to the installations, under terms no less favorable than those applicable to its most favored customer, to be repaid from funds available for the purchase of utility services. Installations should contact the local public utility companies on available Utility Partnering programs and opportunities.

5. ENERGY SAVINGS PERFORMANCE CONTRACTS

Energy Savings Performance Contracting (ESPC) is a contracting procedure in which the contractor implements energy conservation and cost saving measures in exchange for a share of the dollar savings that result from those measures. Key items include:

- ! Contractor evaluates, designs, finances, acquires, installs, operates, and maintains energy savings equipment.
- ! Army gets new energy efficient equipment without any up-front capital investments; capital costs are financed by the contractor.
- ! Contractor is repaid out of savings.
- ! The savings generated and claimed by the contractor are audited monthly or at a minimum annually.
- ! If the savings are lower than guaranteed by the contractor, then the payments to the contractor are lower.
- ! Aggregate annual payments to the contractor can not exceed the amount that the Government would have paid for utilities

(including all operations, maintenance, repair, and other ancillary costs) without the ESPC.

The technologies, type of energy saving measure, financing, and other conditions of the contract determine the level of compensation to the contractor, with the remainder of the savings retained by the Army. Current statute allows the Army to enter into such contracts for Army facilities for up to a maximum of 25 years. This type of contracting provides an alternative method of implementing energy saving projects, when installation resources such as manpower, technical expertise or funding are limited or not available. Detailed procedures for performing ESPC are provided in DAIM-FDF-U memorandum, 6 Sep 95, Army Policy Guidance for Army-wide Implementation of Energy Savings Performance Contracting.

There are several different ways to implement ESPC contracts:

a. Single or multiple Energy Conservation Opportunities (ECOs) at a single base: This is the method that was used in most of the early ESPC contracts. This method requires the Army to invest in the up-front energy audits, feasibility studies, develop solicitation packages, request proposals, and award the contract.

b. Base-Wide Contract: Base-wide contracts were developed in an attempt to reduce the cost and time of implementing ESPC contracts. In a Base-wide contract, contractors are asked to submit proposals and are evaluated on their technical qualifications, proposed mark-up, and financing costs. The selected contractor is then allowed to survey the installation, or parts of installation, to perform audits, feasibility studies, and propose ECOs. The installation can accept the ECOs for further development and award of a delivery order, or reject the ECO(s). Each delivery order under this contract specifies the terms and conditions of any Government payments and performance guarantees.

c. Regional or Area-Wide ESPC: These contracts were developed to further reduce the cost and time of implementing ESPC contracts and make it easier for installations to implement ECOs. This concept is similar to the base-wide contract except that contractors are selected for a region or area. The regional ESPC is an indefinite delivery, indefinite quantity (IDIQ) contract awarded to multiple contractors to investigate, develop, and submit proposals for energy cost-saving measures and award task orders to those contractors at various Army facilities. An installation in the region/area can select one of the pre-selected contractors and then have one or more ECOs performed as

a task order. The first regional ESPC, called the ESPC I, was developed by Huntsville Engineer Support Center (HNC) for the states of VA, GA, NC and SC. Any installation in those four states can use this contract. A second regional ESPC, called ESPC II, was awarded in mid 1997. Installations who are interested or want to use ESPC I or II should contact the HNC POC listed towards the end of this article.

d. Unsolicited Proposals: The Energy Policy Act of 1992 also permits receipt of unsolicited proposals for ESPC services from firms that are qualified to provide such services. If the installation is interested in the proposal then it is required to place a notice in the Commerce Business Daily announcing they have received such a proposal and invite other similarly qualified firms to submit competing proposals. The proposals are then evaluated against written criteria that the installation established. The contractor with the best proposal that meets the installation needs and the criteria is selected for further negotiation and award of contract.

The Army has ten ESPC contracts in place. The first five were developed as single project contracts, three were Base-Wide contracts, and the last two are the ESPC I and ESPC II, regional contracts. Following are the ten contracts awarded to date.

1. Corpus Christi Army Depot, TX
Description: Chiller retrofit
Contract: Awarded 7 Sep 88; contract term = 25 years
Contractor investment = \$755,850
Government's projected share of savings = \$3,460,791 (31.4%)
Contractor's projected share of savings = \$7,572,105 (68.6%)

2. Aliamanu Military Family Housing, Honolulu, HI
Description: HVAC replacement in family housing plus other energy conservation
Contract: Awarded 7 Feb 91; contract term = 15 years
Contractor investment = \$10,150,088
Government's projected share of savings = \$7,841,051 (28%)
Contractor's projected share of savings = \$19,689,758 (72%)

3. Fort Stewart, GA
Description: Propane air mixing plant (base-wide peak shaving)
Contract: Awarded 31 Mar 92; contract term = 15 years, with a 5-year option
Contractor investment = \$921,570
Government's projected share of savings = \$4,042,091 (50.5%)
Contractor's projected share of savings = \$3,968,921 (49.5%)

4. Fort McPherson/Fort Gillem, GA

Description: Propane air mixing plant (base-wide peak shaving)
Contract: Awarded 28 Jul 92; contract term = 15 years, with a 5-year option
Contractor investment = \$1,051,000
Government's projected share of savings = \$7,077,969 (71.6%)
Contractor's projected share of savings = \$2,811,852 (28.4%)

5. Fort Polk, LA

Description: HVAC retrofit in family housing area (4003 units)
Contract: Awarded 31 Jan 94; contract term = 20 years
Contractor investment = \$17,939,926
Government's projected share of savings = \$9,954,974 (22.5%)
Contractor's projected share of savings = \$34,223,679 (77.5%)

6. West Point, NY

Description: Base-Wide Energy Savings Performance Contract
Contract: Awarded 27 Nov 95; contract term = 25 years
Estimated maximum contractor investment = \$10,000,000
Savings: To be determined in individual task orders awarded under the contract.

7. SAGE Complex, Syracuse, NY (Fort Drum), Barnes Building, Boston, MA (Fort Dix)

Description: Base-Wide Energy Savings Performance Contract
Contract: Awarded 27 Nov 95; contract term = 15 years
Estimated maximum contractor investment = \$3,500,000
Savings: To be determined in individual task orders awarded under the contract.

8. Fort Huachuca, AZ

Description: Base-Wide Energy Savings Performance Contract
Contract: Awarded 19 Nov 96; contract term = 25 years
Estimated maximum contractor investment = \$10,000,000
Savings: To be determined in individual task orders awarded under the contract.

9. ESPC I, Area-Wide (GA,NC,SC,VA)

Description: Regional Energy Savings Performance Contract
Contract: Awarded Jan 97; contract term = 25 years, 5 Contractors
Estimated maximum contractor investment = \$355,000,000
Savings: To be determined in individual task orders awarded under the contract.
Contractors Currently in Various Phases at Ft. Stewart, Ft. Bragg, Ft. Benning.

10. ESPC II, Area-Wide (other 46 states, Washington, DC and Puerto Rico)

Description: Regional Energy Savings Performance Contract

Contract: Awarded Aug 97; contract term = 25 years, 11
Contractors
Estimated maximum contractor investment = \$1,000,000,000
Savings: To be determined in individual task orders awarded
under the contract.

Other Contracts under development:

MDW unsolicited proposal MACOM wide
Detroit Arsenal & US Army Garrison-Selfridge, RFP ready to be
advertised
DOE is developing Regional ESPC contracts

In this era of declining resources, ESPCs are an innovative tool
to accomplish energy saving projects, to acquire new equipment,
operation and maintenance, and utility cost reductions. For
additional information on Policy Guidance contact Mr. Qaiser
Toor, DAIM-FDF-U, COM (703) 428-8030; DSN 328, E-Mail:
toor@pentagon-acsim3.army.mil, for implementation contact Mr.
Roger E. Cundiff, U.S. Army Center for Public Works, CECPW-EM,
COM (703) 806-6102; DSN 656, E-Mail:
roger.e.cundiff@cpw01.usace.army.mil, and for Technical
information for ESPC I & II contacts Mr. Bobby Starling,
Huntsville Engineer Support Center COM (205) 895-1531, E-Mail:
starlingb@smtp.hnd.usace.army.mil.

6. ENERGY MANAGER TRAINING

Public Law 102-486 requires all federal agencies to establish and
maintain a program to ensure that facility energy managers are
properly trained. It further defines an energy manager as a
person who has demonstrated proficiency, or who has completed a
course of study in the areas of fundamentals of building energy
systems; building energy codes and applicable professional
standards; energy accounting and analysis; life-cycle cost
methodology; fuel supply and pricing and instrumentation of
energy surveys and audits.

The PROSPECT course, "Energy Management in Existing Federal
Facilities" meets the above requirements. The course is managed
by U.S. Army Center for Public Works and administered by U.S.
Army Engineering and Support Center, Huntsville. POC at CPW is
Mr. Jim Paton, 703-806-6091, DSN 656-6091, E-Mail:
jim.b.paton@cpw01.usace.army.mil.

7. ENERGY AUDIT AND RETROFIT PROGRAM

The U.S. Army Center for Public Works has been executing lighting survey and retrofit work through indefinite delivery, indefinite quantity contracts since February 1995. Since that time, over 20 million square feet of facilities have been evaluated for lighting retrofit projects and over \$4 million in retrofit work has been completed. Another \$2 million of retrofit work is in progress under a current contract.

The current contract offers a wide variety of lighting retrofit services to include upgrade of fluorescent fixtures to T8 lamp and electronic ballast configuration, replacement of incandescent lamps with compact fluorescent, and replacement of exit signs to LED. Other services offered include installation of motion sensors, delamping, installation of reflectors, and fixture replacement. There are currently no retrofit capabilities in the contract for high intensity discharge (HID) fixtures.

Experience has shown that very competitive prices are established in these types of area wide firm-fixed price, indefinite quantity, indefinite delivery contracts. Results of recently executed projects show an average cost of roughly 70 cents per square foot of buildings space, for a complete lighting retrofit of the building. For reference, retrofit of four-foot fluorescent fixtures cost less than \$50 each.

Installations interested in executing lighting retrofit projects are encouraged to consider using existing area wide contracts as a cost-effective and time saving alternative to developing their own local contracts. To use the survey/retrofit contract managed by USACPW, installations must provide details of the work requested and provide funding by Military Interdepartmental Purchase Request based on estimated costs. USACPW will issue delivery orders to the contractor and manage contracting actions. The installation must coordinate day-to-day on-site actions such as building access and verify work has been completed to their satisfaction. POC at CPW is Mr. Jim Paton, 703-806-6091, DSN 656-6091, E-Mail: jim.b.paton@cpw01.usace.army.mil.

8. CENTRAL HEATING PLANT REPAIR & MODERNIZATION PROGRAM

The purpose of this O&M funded repair program is to modernize old and failing central heating plant equipment and distribution systems in such a way that the modernized plants and distribution systems will provide the installations with reliable, safe, energy efficient and environmentally friendly service. Beginning in FY98 O&M repair funds will be available for modernization of Army central heating plants and their distribution systems. The Army Utilities Modernization Program is budgeted at \$60M a year for a total of \$300M over 5 years. POC at CPW is Mr. Dennis Vevang, 703-806-6071, DSN 656-6071, E-Mail: dennis.i.vevang@cpw01.usace.army.mil.

9. WATER CONSERVATION

The Energy Policy Act of 1992 (EPACT) requires federal facilities to identify and implement energy and water conservation measures which payback in ten years or less. Executive Order 12902 reiterates this requirement and mandates facility energy and water audits to identify cost effective measures. In order to meet the water conservation requirements of the EPACT and E.O. 12902, water conservation is now included in the Army Facilities Energy Program. Projects which meet the energy criteria (i.e., payback in less than ten years and have a savings-to-investment ratio greater than 1.25), are eligible for energy funding.

Water audits may be obtained through the Energy Engineering Analysis Program (EEAP) or CPW. Good candidates for water conservation projects are: plumbing fixture retrofits, leak detection and repair; landscaping and irrigation modifications; and cooling tower water treatment. POC at CPW is Ms. Jane Anderson, 703-806-5214, DSN 656-5214, E-Mail: jane.l.anderson@cpw01.usace.army.mil.

10. ENERGY AWARENESS SEMINARS

The US Army Logistics Integration Agency (USALIA) conducts energy awareness seminars at installations on a worldwide basis. These seminars are conducted in two parts. First, there is a Pre-seminar Site Reconnaissance Visit (PSRV) of the installation conducted by a team of energy engineers contracted by the Army. The purpose of the PSRV is to identify low-cost and no-cost energy-saving opportunities specific to the installation. The second part of the seminar consists of a presentation made by HQDA, USACPW, and the contract energy engineers to installation personnel. These presentations explain the energy-saving opportunities identified during the PSRV, identify the potential cost savings associated with each recommendation, and help to re-emphasize key elements of the energy program.

The seminar program is not an inspection but rather a tool to help management determine the costs and/or consequences of maintenance or energy-related projects. Seminars provide outside expertise to the installation staff to assist them in meeting their energy goals.

Installations request seminars through their MACOM headquarters, and these requests are forwarded to USALIA. Installations are selected based on the number of requests and availability of DA funding. The seminars are only conducted at installations where the chain of command is interested and supports the energy program. POC at USALIA is Mr. Jeff Hager, 717-770-6711, DSN 977-6711, E-Mail: hagerjl@hqda.army.mil.

11. DEFENSE UTILITY ENERGY REPORTING SYSTEM (DUERS) AND ARMY DUERS DATA SYSTEM (ADDS)

DUERS is the automated management information system with which DoD monitors its supplies and consumption of energy. The Army utilizes the ADDS system to collect this information, then transmits it to DoD. ADDS is designed to facilitate energy management by means of timely and accurate information on all energy consumption. The ADDS provides information and conservation data on the consumption of petroleum and purchased utility energy and renewable energy sources. The system provides

essential energy management information to installation, major subordinate commands, MACOMs, DA and DoD. This information is essential to determine progress towards goals/targets, developing budget requirements and for mission planning. The ADDS system has over fifty automated reports to assist installations, MACOMs and DA to check progress to goals; and the data can be used to project future petroleum and utility fuels usage and costs. The ADDS system currently is a personal computer based reporting system and will be upgraded to a web based reporting system. POC at CPW is Mr. Ken Zandler, (703) 806-6239, DSN 656-6239, E-Mail: ken.w.zandler@cpw01.usace.army.mil.

CONCLUSION

The facilities energy management support program helped enable the Department of the Army to achieve a 20.8 (Mbtu/Ksf) energy reduction from FY85 to FY97, with a cost avoidance in excess of \$1.5 Billion. The continuation of this program coupled with energy efficient new construction should enable the Army to achieve the energy reduction goals of Executive Order 12902.

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